



## Glass Axial Switching Diode

**Qualified per MIL-PRF-19500/116**

Qualified Levels:  
JAN, JANTX, and  
JANTXV

### DESCRIPTION

This popular 1N4148-1 JEDEC registered switching/signal diode features internal metallurgical bonded construction for military grade products per MIL-PRF-19500/116. This small low capacitance diode, with very fast switching speeds, is hermetically sealed and bonded into a double-plug DO-35 package. It may be used in a variety of very high speed applications including switchers, detectors, transient OR'ing, logic arrays, blocking, as well as low-capacitance steering diodes, etc. Microsemi also offers a variety of other switching/signal diodes.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

### FEATURES

- Popular JEDEC registered 1N4148 number.
- Hermetically sealed glass construction.
- Metallurgically bonded.
- Double plug construction.
- Very low capacitance.
- Very fast switching speeds with minimal reverse recovery times.
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/116.
- MSP screening is also available in reference to MIL-PRF-19500 (JANS).  
(See [part nomenclature](#) for all available options.)
- RoHS compliant version available (commercial grade only).

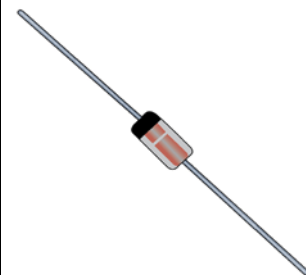
### APPLICATIONS / BENEFITS

- High frequency data lines.
- Small size for high density mounting using flexible thru-hole leads (see package illustration).
- RS-232 & RS-422 interface networks.
- Ethernet 10 base T.
- Low capacitance steering or blocking.
- LAN.
- Computers.

### MAXIMUM RATINGS @ 25 °C unless otherwise stated

| Parameters/Test Conditions                                | Symbol            | Value       | Unit   |
|-----------------------------------------------------------|-------------------|-------------|--------|
| Junction and Storage Temperature                          | $T_J$ & $T_{STG}$ | -65 to +175 | °C     |
| Thermal Resistance Junction-to-Lead <sup>(1)</sup>        | $R_{\theta JL}$   | 250         | °C/W   |
| Thermal Resistance Junction-to-Ambient <sup>(2)</sup>     | $R_{\theta JA}$   | 325         | °C/W   |
| Maximum Breakdown Voltage                                 | $V_{(BR)}$        | 100         | V      |
| Working Peak Reverse Voltage                              | $V_{RWM}$         | 75          | V      |
| Average Rectified Current @ $T_A = 75$ °C <sup>(3)</sup>  | $I_O$             | 200         | mA     |
| Non-Repetitive Sinusoidal Surge Current ( $t_p = 8.3$ ms) | $I_{FSM}$         | 2           | A (pk) |

- NOTES:**
1. Lead length = .375 inch (9.35 mm). See [Figure 2](#) for thermal impedance curves.
  2.  $T_A = +75$ °C on printed circuit board (PCB), PCB = FR4 - .0625 inch (1.59 mm) 1-layer 1-Oz Cu, horizontal, in still air; pads for axial = .092 inch (2.34 mm) diameter, strip = .030 inch (0.76 mm) x 1 inch (25.4 mm) long, lead length  $L \leq 0.187$  inch ( $\leq 4.75$  mm);  $R_{\theta JA}$  with a defined PCB thermal resistance condition included, is measured at  $I_O = 200$  mA.
  3. See [Figure 1](#) for derating.



**DO-35 (DO-204AH)  
Package**

Also available in:

**DO-213AA package**  
(surface mount)  
 [1N4148UR-1](#)

**UB package**  
(surface mount)  
 [1N4148UB](#)

**UB2 package**  
(2-Pin surface mount)  
 [1N4148UB2](#)

**UBC package**  
(Ceramic Lid surface mount)  
 [1N4148UBC](#)

### MSC – Lawrence

6 Lake Street,  
Lawrence, MA 01841  
Tel: 1-800-446-1158 or  
(978) 620-2600  
Fax: (978) 689-0803

### MSC – Ireland

Gort Road Business Park,  
Ennis, Co. Clare, Ireland  
Tel: +353 (0) 65 6840044  
Fax: +353 (0) 65 6822298

### Website:

[www.microsemi.com](http://www.microsemi.com)

**MECHANICAL and PACKAGING**

- CASE: Hermetically sealed glass package.
- TERMINALS: Tin/lead plated or RoHS compliant matte-tin (on commercial grade only) over copper clad steel. Solderable per MIL-STD-750, method 2026.
- POLARITY: Cathode indicated by band.
- MARKING: Part number.
- TAPE & REEL option: Standard per EIA-296. Consult factory for quantities.
- WEIGHT: 0.2 grams.
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**JAN 1N4148 -1 (e3)**

**Reliability Level**

JAN = JAN level  
 JANTX = JANTX level  
 JANTXV = JANTXV level  
 MSP (reference JANS)  
 See 1N6642 for JANS level  
 Blank = Commercial grade

**RoHS Compliance**

e3 = RoHS compliant (on commercial grade only)  
 Blank = non-RoHS compliant

**Metallurgically Bonded**
**JEDEC type number**

(see [Electrical Characteristics](#) table)

**SYMBOLS & DEFINITIONS**

| Symbol    | Definition                                                                                                                                                                                                                      |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_R$     | Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.                                                                                                                 |
| $I_o$     | Average Rectified Forward Current: The output current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.                                                                       |
| $t_{rr}$  | Reverse Recovery Time: The time interval between the instant the current passes through zero when changing from the forward direction to the reverse direction and a specified decay point after a peak reverse current occurs. |
| $V_F$     | Forward Voltage: The forward voltage the device will exhibit at a specified current (typically shown as maximum value).                                                                                                         |
| $V_R$     | Reverse Voltage: The reverse voltage dc value, no alternating component.                                                                                                                                                        |
| $V_{RWM}$ | Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range excluding all transient voltages (ref JESD282-B). Also sometimes known as PIV.                                  |

**ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise noted**

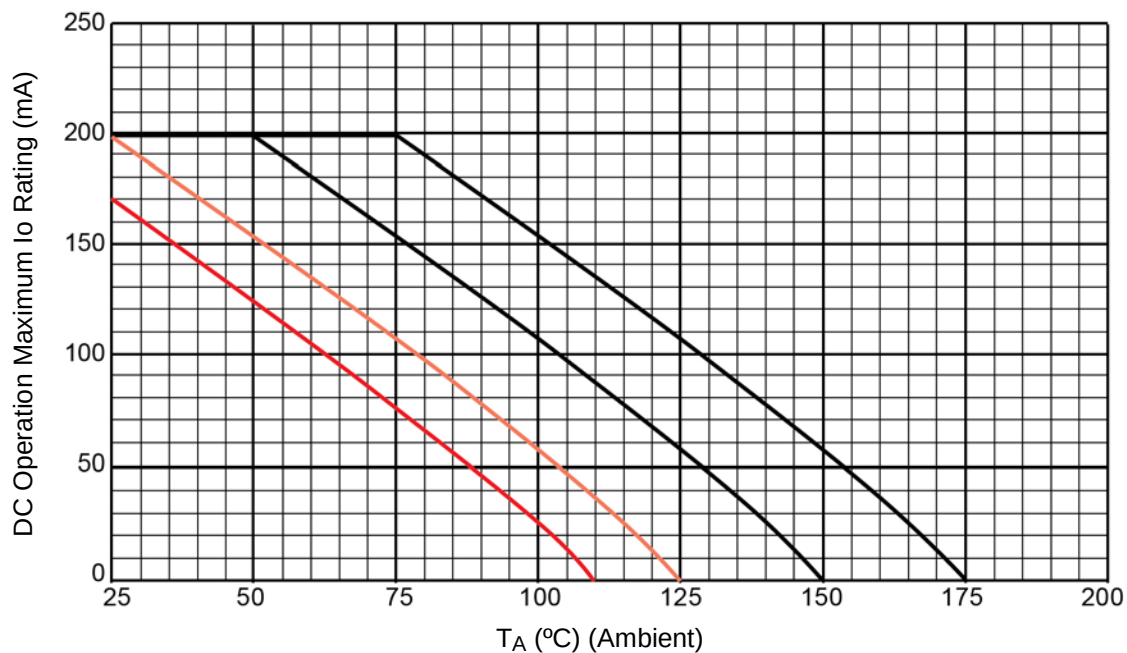
| FORWARD VOLTAGE<br>$V_{F1}$ @<br>$I_F=10$ mA | FORWARD VOLTAGE<br>$V_{F2}$ @<br>$I_F=100$ mA | REVERSE RECOVERY TIME<br>$t_{rr}$<br>(Note 1) | FORWARD RECOVERY TIME<br>$t_{fr}$<br>(Note 2) | REVERSE CURRENT<br>$I_{R1}$ @ 20 V | REVERSE CURRENT<br>$I_{R2}$ @ 75 V | REVERSE CURRENT<br>$I_{R3}$ @ 20 V<br>$T_A=150^{\circ}\text{C}$ | REVERSE CURRENT<br>$I_{R4}$ @ 75 V<br>$T_A=150^{\circ}\text{C}$ | CAPACITANCE<br>C<br>(Note 3) | CAPACITANCE<br>C<br>(Note 4) |
|----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------|------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|------------------------------|------------------------------|
| V                                            | V                                             | ns                                            | ns                                            | nA                                 | $\mu\text{A}$                      | $\mu\text{A}$                                                   | $\mu\text{A}$                                                   | pF                           | pF                           |
| 0.8                                          | 1.2                                           | 5                                             | 20                                            | 25                                 | 0.5                                | 35                                                              | 75                                                              | 4.0                          | 2.8                          |

**NOTE 1:**  $I_F = I_R = 10$  mA,  $R_L = 100$  Ohms.

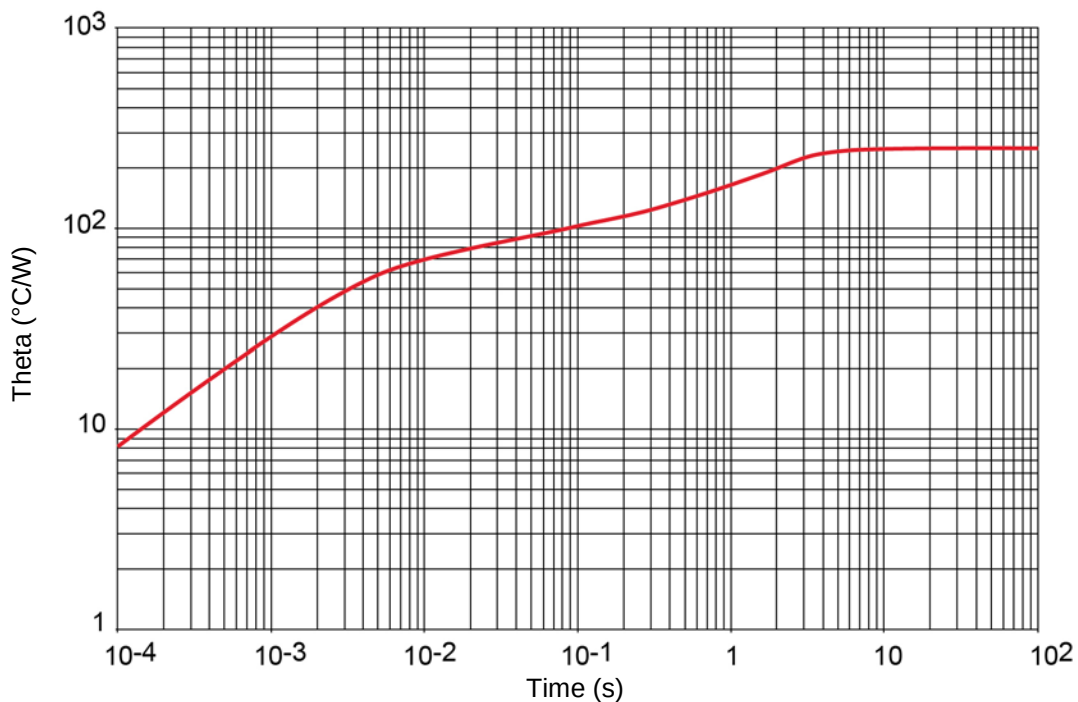
**NOTE 2:**  $I_F = 50$  mA.

**NOTE 3:**  $V_R = 0$  V,  $f = 1$  MHz,  $V_{SIG} = 50$  mV (pk to pk).

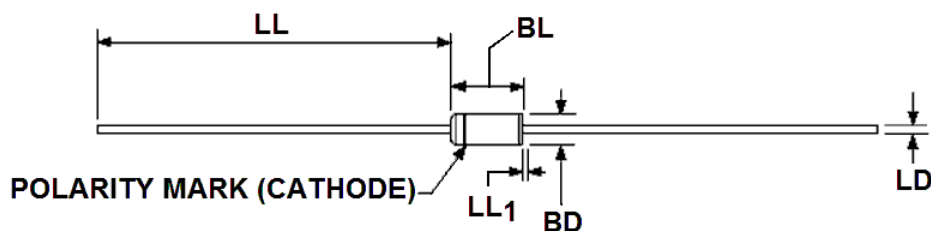
**NOTE 4:**  $V_R = 1.5$  V,  $f = 1$  MHz,  $V_{SIG} = 50$  mV (pk to pk).

**GRAPHS**


**FIGURE 1 – Temperature – Current Derating**



**FIGURE 2 – Thermal Impedance**

**PACKAGE DIMENSIONS**


| Ltr             | Dimensions |       |             |       | Notes |
|-----------------|------------|-------|-------------|-------|-------|
|                 | Inch       |       | Millimeters |       |       |
|                 | Min        | Max   | Min         | Max   |       |
| BD              | .056       | .075  | 1.42        | 1.91  | 3     |
| BL              | .140       | .180  | 3.56        | 4.57  | 3     |
| LD              | .018       | .022  | 0.46        | 0.56  |       |
| LL              | 1.000      | 1.500 | 25.40       | 38.10 |       |
| LL <sub>1</sub> |            | .050  |             | 1.27  | 4     |

**NOTES:**

1. Dimensions are in inch.
2. Millimeters are given for general information only.
3. Package contour optional within BD and length BL. Heat slugs, if any, shall be included within this cylinder but shall not be subject to minimum limit of BD. The BL dimension shall include the entire body including slugs.
4. Within this zone lead, diameter may vary to allow for lead finishes and irregularities other than heat slugs.
5. In accordance with ASME Y14.5M, diameters are equivalent to  $\Phi$ x symbology.